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EXAMINER

NGUYEN, DAVE TRONG

ART UNIT

PAPER NUMBER

1632

12

DATE MAILED: 07/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/807,332

Applicant(s)

Burke

Examiner

Dave Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-25 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claims 9-25 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 10, 15, 18 and 24 are rejected under 35 USC 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Applicant's claims 10, 15, 18 and 24 embrace a viral vector such as an adenoviral vector, which contains within macromolecular assemblies a CPT/oligo complex. Applicant's contemplates on page 25, for example, that the CPTs complexes can be introduced, stored and delivered in a stable manner while being bound in the active lactone form to the oligos contained in the viral vectors. Applicant neither provides any guidance nor working examples so as to enable a skilled artisan to reasonably prepare such viral vectors within the framework of the claimed invention.

The state of the art of using viral vectors to deliver DNA (Verma, Nature, Vol. 389, 1997, 239-242) is that the DNA has to be prepared in an expressible structure, which comprises a regulatory sequence operably linked to a coding sequence of a desire DNA such as an antisense mRNA. However, the as-filed specification teaches that any oligonucleotide/CPT can be stored and maintained in a viral vector, and yet, the as-filed specification does not provide any guidance as to how CPT which is a toxic drug can be stored stably in any viral vector to the extent that the intended use of the viral vectors containing CPT/oligo complexes can be achieved so as to have

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a chemotherapeutic effect. The state of the art with respect to the use of CPTs in a virus (Pantazis, J. Biomedical Science, 6, 1, 1-7, 1999) is that CPT is a potent inhibitor of replication, transcription and packaging of double-stranded DNA-containing adenoviruses, papovaviruses and herpesviruses. As such, it is not apparent how a skilled artisan, without any undue experimentation, can prepare the claimed viral vectors so as to use within applicant's framework of the claimed invention, particularly in view of the reasons set forth above.

Applicant's response (dated April 3, 2003) has been considered by the examiner but is not found persuasive for the reasons of record and the following reasons.

Applicant asserts that page 25 line 7 to page 26 line 6 and page 27 line 14 to page 37 line 23 are sufficient to overcome the above stated rejection. The examiner has considered not only those cited page but also the as-filed specification, however, neither the as-filed specification nor applicant's response provide any factual and/or substantial evidence to address the issues as set forth in the stated rejection. Thus, the rejection is maintained.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

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Claims 18-21 are rejected under 35 USC 102(a) as being anticipated by Thompson Strode, H. Peter Spielmann, and Andrew Wang, as co-authors of the reference cited in J. Am. Chem. Soc. 120, 2979-2980, Published on Web, March 12, 1998.

Thompson Strode, H. Peter Spielmann, and Andrew Wang (Strode) teaches that the hydrolysable alpha-hydroxy-lactone ring of any camptothecin used as a chemotherapeutic drug is essential for CPTs efficacy. In addition, Strode teaches that CTPs-duplex oligonucleotide complexes when prepared as a mixture of CPTs and synthetic oligonucleotides in a typical PBS buffer, promotes the complex formation between CPTs and the oligonucleotides and stabilizes the lactone forms of CPT (page 361 bridging page 362, and page 363).

Absent evidence to the contrary, the composition discloses in Strode has all of the functional properties as recited in the claims.

Applicant's response (pages 2) has been considered by the examiner but is not found persuasive for the reasons set forth in the stated rejection and because of the following reasons:

1/ Applicant asserts that due to the functional limitation of "chemotherapeutic" and/or "pharmaceutically effective amount" and/or "therapeutic activity", the Strode reference does not teach all of the required limitations.

However, the examiner maintains that the stated rejection does provide a rationale and/or evidence showing that the claimed product appears to be the same or similar to that of the prior art, e.g., Strode teaches that the hydrolysable alpha-hydroxy-lactone ring of any camptothecin used as a chemotherapeutic drug is essential for CPTs efficacy. In addition, Strode teaches that CTPs-duplex oligonucleotide complexes when prepared as a mixture of CPTs and synthetic oligonucleotides in a typical PBS buffer, promotes the complex formation between CPTs and the oligonucleotides and stabilizes the lactone forms of CPT (page 361 bridging page 362, and page 363), and as such, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir.1983). Applicant's latest response neither establishes nor provides sufficient evidence to meet its burden.

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Applicant further alleged the teaching away element contained in Strode even if the Strode reference is the 102 reference which teaches all of the elements in the claims including the singled stranded DNA. The fact that a singled stranded DNA is not as active as a doubled stranded oligo in stabilizing both TPT and CPT-11 does not rise to the teaching away element. As long as the Strode reference teaches the composition as claimed the composition is anticipatory.

Moreover, the prior art's failure to actually measure and/or compare the therapeutic activity of the claimed composition does not necessarily mean that the composition of the prior art would not exhibit the "therapeutic activity". The examiner further maintains that the office does not have the facilities for examining and comparing applicant's product with the product of the prior art in order to establish that the product of the prior art does not possess the same material, structural and functional characteristics of the claimed product. In the absence of factual evidence to the contrary, the burden is upon the applicant to prove that the claimed products are functionally different than those taught by the prior art and to establish patentable differences. See *Ex parte Phillips*, 28 USPQ 1302, 1303 (BPAI 1993), *In re Best*, 562, F.2d 1252, 195 USPQ 430 (CCPA 1977) and *Ex parte Gray*, 10 USPQ2d 1922, 1923 (BPAI 1989).

Claims 18-21 are rejected under 35 USC 102(b) as being anticipated by Chourpa (Spectroscopy of Biological Molecules: Modern Trends, [European Conference on Spectroscopy of Biological Molecules], 7th, Madrid, 1997).

Chourpa teaches it is well recognized in the prior art that the hydrolysable alpha-hydroxy-lactone ring of any camptothecin used as a chemotherapeutic drug is essential for CPTs efficacy. In addition, Chourpa teaches that CTPs-oligonucleotide complexes when prepared as a mixture of CPTs and synthetic oligonucleotides in a typical aqueous buffer at PH 7.3, promotes the complexation between CPTs and the oligonucleotides and stabilizes the lactone forms of CPT (page 361 bridging page 362, and page 363).

Absent evidence to the contrary, the composition disclosed in Chourpa has all of the functional properties as recited in the claims.

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Applicant (the response page 3) further attempts to rely upon the teaching of oligonucleotide 3 only in order to allege that Chourpa does not teach the claimed composition. However, the rejection is in no way meant to be focused on oligonucleotide 3. The fact that a composition comprising oligo 1 or oligo 2 together with lactone camptothecin drug is taught in Chourpa is indicative of a proper anticipation of the claimed composition which clearly embraces any composition comprising any oligo in combination with a lactone camptothecin drug, and as such, the composition comprising oligo 1 or oligo 2 together with lactone camptothecin drug anticipates the claimed composition. Again, Applicant asserts the functional limitations as indicated above, however, there is no substantial evidence to show that the compositions of Chourpa does not exhibit an therapeutic activity. Furthermore, Chourpa teaches that it is well recognized in the prior art that the hydrolysable alpha-hydroxy-lactone ring of any camptothecin used as a chemotherapeutic drug is essential for CPTs efficacy. In addition, Chourpa teaches that CTPs-oligonucleotide complexes when prepared as a mixture of CPTs and synthetic oligonucleotides in a typical aqueous buffer at PH 7.3, promotes the complexation between CPTs and the oligonucleotides and stabilizes the lactone forms of CPT. As such, given the well-recognized use of hydrolysable alpha-hydroxy-lactone ring of any camptothecin used as a chemotherapeutic drug, it is apparent that the composition comprising a mixture of CPTs and synthetic oligonucleotides in a typical aqueous buffer at PH 7.3, promotes the complexation between CPTs and the oligonucleotides and stabilizes the lactone forms of CPT, which would necessarily lead to its efficacy as a chemotherapeutic drug, particularly in the absence of evidence to the contrary, and in view of the reasons as discussed *supra*.

Claims 9-13, 18-22, 24, 25 are rejected under 35 USC 103(a) as being unpatentable over Green et al. (US Pat No. 5,583,034) taken with either Strode or Chourpa (Spectroscopy of Biological Molecules: Modern Trends, [European Conference on Spectroscopy of Biological Molecules], 7th, Madrid, 1997, 361-362 alone, or further in view of Perez-Soler et al. (US Pat No. 5,834,012).

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Green teaches a pharmaceutical composition for treating a tumor, wherein the pharmaceutical composition comprising a mixture of Camptothecins (CPTs) in a pharmaceutically acceptable buffer and/or carrier (column 8, lines 16-26, column 9, lines 11-24). Column 6, lines 36-66 of Green also discloses that liposomal carrier can be used to encapsulate and deliver the antisense oligonucleotide composition, and that any pharmaceutically acceptable buffer or aqueous solution can be used to prepare the antisense oligonucleotide composition. In addition, columns 11 and 12 disclose the sequence structure of the antisense oligos comprising GC base pairs. Green does not teach that lactone forms must be present in a Camptothecin, and that the antisense oligos are complexed in the pharmaceutical composition.

However, at the time the invention was made, it is well known in the prior art that (as evidenced by Chourpa and Strode), that the hydrolysable alpha-hydroxy-lactone ring of any camptothecin used as a chemotherapeutic drug is essential for CPTs efficacy. In addition, Chourpa and Strode both teach that CTPs-oligonucleotide complexes when prepared as a mixture of CPTs and synthetic oligonucleotides in a typical aqueous buffer promotes the complexation between CPTs and the oligonucleotides and stabilizes the lactone forms of CPT.

In addition, Perez-Soler et al. teaches that CPTs drugs are well described in the prior art and that liposomes can be used to trap and stabilize the lactone form of CPT (entire disclosure, particularly column 1 bridging column 2, and column 3).

It would have been obvious for one of ordinary skill in the art to have employed the pure lactone forms of CPTs as the chemotherapeutic drug in the pharmaceutical composition of Green. One would have been motivated to do so because is well-known in the prior art, as exemplified by Chourpa and Strode, that the hydrolysable alpha-hydroxy-lactone ring of any camptothecin used as a chemotherapeutic drug is essential for CPTs efficacy.

It would also have been obvious to one of ordinary skill in the art that the affinity between CPTs and antisense oligonucleotides so as to form a complex of CPTs and oligos is the intrinsic property of the CPTs when put in contact with oligonucleotides, particularly in light of the Chourpa

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reference which teaches as long as a mixture of CPTs and oligos is prepared in a typical buffer solution, complexes of CPTs and oligos are formed as a result of the affinity.

To the extent that the presently pending claims embrace the use of a liposomal carrier to protect and delivery an antisense oligo and CPT containing composition, it would have been obvious for one of ordinary skill in the art to have employed any known liposomal carrier to deliver the antisense oligo/CPT complexes present in the pharmaceutical composition of Green taken with Chourpa. One would have been motivated to do so because column 6, lines 36-66 of Green also discloses that liposomal carrier can be used to encapsulate and deliver the antisense oligonucleotide composition, and/or because Perez-Soler et al. teaches that CPTs drugs are well-described in the prior art and that liposomes can be used to stabilize the lactone form of CPT.

Thus, the claimed invention as a whole was prima facie obvious.

Claims 10, 14, 18 and 22 are rejected under 35 USC 103(a) as being unpatentable over Green et al. (US Pat No. 5,583,034) taken with either Chourpa (Spectroscopy of Biological Molecules: Modern Trends, [European Conference on Spectroscopy of Biological Molecules], 7th, Madrid, 1997, 361-362 or Strode, and further in view of Matteucci (J. Am. Chem. Soc. 1997, Vol. 119, 6939-6940).

Green taken with either Chourpa or Strode is applied here as indicated above for the base claims 10 and 18. To the extent that Green taken with either Chourpa or Strode does not teach a covalent bonding between any oligonucleotide and the CPTs, Matteucci teaches that such conjugation has been prepared, that the A and B rings of a CPT can be substituted in a variety of ways without the loss of activity, and further teach that triple helix forming oligos can be used to conjugate to CPTs so as to render sequence specific with respect to the activity of CPTs (page 6939).

It would have been obvious for one of ordinary skill in the art to have employed a covalent bond between CPTs and any oligo, including those disclosed in Green and/or Matteucci. One would have been motivated to do so because it is well-known in the prior art, as exemplified

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by Matteucci, to use a covalent bond to conjugate CPT to a oligonucleotide, and because Matteucci provides evidence showing that the A and B rings of a CPT can be substituted in a variety of ways without the loss of activity.

Thus, the claimed invention as a whole was prima facie obvious.

Claims 18 and 22 are rejected under 35 USC 103(a) as being unpatentable over Chourpa (Spectroscopy of Biological Molecules: Modern Trends, [European Conference on Spectroscopy of Biological Molecules], 7th, Madrid, 1997, 361-362, and further in view of Matteucci (J. Am. Chem. Soc. 1997, Vol. 119, 6939-6940).

Chourpa is applied here as indicated above for the base claim 18. To the extent that Chourpa does not teach a covalent bonding between any oligonucleotide and the CPTs, Matteucci teaches that such conjugation has been prepared, that the A and B rings of a CPT can be substituted in a variety of ways without the loss of activity, and further teach that triple helix forming oligos can be used to conjugate to CPTs so as to render sequence specific with respect to the activity of CPTs (page 6939).

It would have been obvious for one of ordinary skill in the art to have employed a covalent bond between CPTs and any oligo, including those disclosed in Chourpa and/or Matteucci. One would have been motivated to do so because it is well-known in the prior art, as exemplified by Matteucci, to use a covalent bond to conjugate CPT to a oligonucleotide, and because of the reasons set forth in Matteucci, particularly since Matteucci provides evidence showing that the A and B rings of a CPT can be substituted in a variety of ways without the loss of activity.

Thus, the claimed invention as a whole was prima facie obvious.

Applicant further asserts on page 3 and page 4 that the mixture is not the same as complex, however, the stated rejection is not relied upon only the teaching of a the term "mixture" but rather relied upon the combined teachings provided by the combined references as a whole. In this instance, Chourpa and Strode both teach that CTPs-oligonucleotide complexes when

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prepared as a mixture of CPTs and synthetic oligonucleotides in a typical aqueous buffer promotes the complexation between CPTs and the oligonucleotides and stabilizes the lactone forms of CPT. As such, and given the high level of one of ordinary skill in the art of CPT/oligonucleotide drug, it would also have been obvious to those of ordinary skill in the art that the affinity between CPTs and antisense oligonucleotides so as to form a complex of CPTs and oligos is the intrinsic property of the CPTs when put in contact with oligonucleotides, particularly in light of the Chourpa reference which teaches as long as a mixture of CPTs and oligos is prepared in a typical buffer solution, complexes of CPTs and oligos are formed as a result of the affinity.

Applicant again on pages 4 and 5 focuses narrowly on the one particular section of Green and then alleged that the secondary references fail to provide the missing limitations. However, as discussed *supra*, the combined cited references have to be considered as whole, and as such, the combined cited references do teach, suggest, and provide a motivation for one of ordinary skill in the art to employ the composition as claimed in claim 18 as chemotherapeutic in the treatment of cancer.

Applicant's response on page 5 is again not substantial to overcome the rejections as set forth above, and these assertions have been discussed *supra*, and as such, the rejections are properly made and maintained for the reasons of record. As stated in the previous office action, the fact that the term "complex" is not disclosed explicitly in Green alone does not render the claimed invention patentable, particularly since a complex of CPTs and oligos is the intrinsic property of the CPTs when put in contact with oligonucleotides, particularly in light of the Chourpa reference which teaches as long as a mixture of CPTs and oligos is prepared in a typical buffer solution, complexes of CPTs and oligos are formed as a result of the affinity.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the

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mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications regarding the formalities should be directed to Patent Analyst Dianiece Jacobs, whose telephone number is **(703) 305-3388**.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner *Dave Nguyen* whose telephone number is **(703) 305-2024**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, *Deborah Reynolds*, may be reached at **(703) 305-4051**.

Papers related to this application may be submitted to Group 1600 by facsimile transmission. Papers should be faxed to Group 1600 via the PTO Fax Center located in Crystal Mall 1. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CM1 Fax Center number is **(703) 305-7401**.

Any inquiry of a general nature or relating to the status of this application should be directed to the *Group receptionist* whose telephone number is **(703) 308-0196**.

Dave Nguyen
Primary Examiner
Art Unit: 1632



DAVE T. NGUYEN
PRIMARY EXAMINER